

## CLAIMS

What is claimed is:

1. A method of aiding in the diagnosis of the neoplastic condition or susceptibility to a neoplastic condition of an animal cell or tissue comprising:  
determining the amount of expression of a MART-1 protein in a test sample isolated from said cell or tissue, and  
diagnosing a neoplastic condition or susceptibility to a neoplastic condition based on the amount of expression of the MART-1 protein.
2. The method of claim 1, wherein the amount of expression of said protein is determined by detecting the amount of mRNA transcribing said protein.
3. The method of claim 2, wherein said detecting is by probing said test sample with a probe or primer that specifically hybridizes under conditions of moderate or highly stringent conditions with said MART-1 mRNA.
4. The method of claim 3, wherein said probe or primer is detectably labeled.
5. The method of claim 3, wherein said probe or primer comprises a sequence that is complementary to a sequence selected from the group consisting of SEQ ID NOs. 1 and 26, and complements of these sequences.
6. The method of claim 3, wherein said probe or primer comprises a nucleic acid complementary to a sequence encoding a peptide selected from the group consisting of SEQ ID NOs. 2 and 25, and complements of nucleic acids encoding said peptides.
7. The method of claim 1, wherein said expression is at least 2 fold greater than in a normal or control sample.
8. The method of claim 1, wherein said detected is determined by probing said sample with an agent that specifically recognizes and binds said protein.

9. The method of claim 8, wherein said agent comprises a biologically active immunoglobulin variable domain that specifically recognizes or binds to said protein or an antigen binding fragment thereof.
10. The method of claim 9, wherein said agent is a polyclonal or monoclonal antibody.
11. The method of claim 9, wherein said agent is a cell that binds to said protein.
12. The method of claim 11, wherein said cell is an immune effector cell raised in the presence and at the expense of a peptide selected from the group consisting of SEQ. ID NOS. 2, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 and 25.
13. The method of claim 3, wherein said probe or primer is complementary to a sequence encoding at least 9 consecutive residues of the amino acid sequence of SEQ ID No. 2 or 25.
14. The method of claim 7, wherein said test sample is isolated from a melanocyte.
15. The method of claim 3, wherein said probe or primer is immobilized on a solid support.
16. The method of claim 10, wherein said detecting is by *in vivo* imaging.
17. The method of claim 10, wherein said monoclonal antibody is prepared from an animal immunized with a peptide selected from the group consisting of SEQ ID NOs. 2, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 and 25.
18. The method of claim 10, wherein said agent comprises a biologically active immunoglobulin variable domain isolated from an antibody prepared from an animal immunized with a peptide selected from the group consisting of SEQ ID NOs. 2, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 and 25.

19. The method of claim 3, wherein said detection is by polymerase chain reaction or by hybridization assay.
20. The method of claim 15, wherein said solid support is a chip.
21. The method of claim 1, wherein expression of said protein is by determining the identity and expression level of mRNA by expression analysis and comparing the sequences and amount of mRNA to expression analysis of a control sample
22. A diagnostic kit comprising at least one agent that specifically recognizes and binds MART-1 protein and instructions for detecting binding between MART-1 protein in a test sample and said agent.
23. A kit of claim 22, wherein said agent is immobilized on a solid support.
24. A kit of claim 22, wherein said solid support is selected from the group consisting of nitrocellulose, latex, plastic and chip.
25. A kit of claim 22, wherein said agent is an antibody and said detection reagent comprises an anti-immunoglobulin, protein G, protein A, or lectin.
26. A kit of claim 22, wherein said detecting is selected from the group consisting of radioisotopes, fluorescent groups, luminescent groups, enzymes, biotin and dye particles.
27. A diagnostic kit comprising a probe or primer of claim 3.
28. An assay to screen for agents that modulate the binding of MART-1 protein to its ligand comprising contacting a sample comprising said protein and said ligand under conditions and in the presence of a test agent and detecting any binding between said protein and said ligand, a change in said binding being indicative of an agent that modulates the binding of MART-1.

29. The assay of claim 28, wherein said modulation comprises increased avidity or affinity between said agent and said protein.

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